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HOOPING-COUGH.

REMARKS ON ITS HISTORY, PREVALENCE,
SYMPTOMS, AND TREATMENT.

BY

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DEDICATED
TO
MY COLLEAGUES,
THE MEMBERS OF THE MEDICAL AND SURGICAL STAFF
OF THE
HOSPITAL FOR SICK CHILDREN, GREAT ORMOND STREET,
WITH ESTEEM AND REGARD,
BY
THEIR MOST FAITHFUL AND OBEDIENT SERVANT,
THE AUTHOR.

CONTENTS.

	PAGE
I. HISTORY OF HOOPING-COUGH	5
II. PREVALENCE OF HOOPING-COUGH	8
III. OCCURRENCE OF A SECOND ATTACK	8
IV. SYMPTOMS	9
V. TREATMENT; WITH DESCRIPTION OF MACHINE FOR DIFFUSING CARBOLIC ACID VAPOUR	11

HOOPING-COUGH.

I.—THE HISTORY OF HOOPING-COUGH.

THE principal object of the following remarks on hooping-cough is to direct attention to this serious cause of mortality in early life, and to point out the preliminary steps which should be taken to diminish its influence.

The disease requires to be studied on an extensive scale* before we can arrive at such general conclusions regarding its peculiar nature as to enable us to reconcile the various kinds of treatment which have been recommended by medical authorities for its cure or relief, and, what is equally important, to determine, if possible, the most effective means of opposing its singularly contagious properties.

Whatever value these remarks may possess, is to be attributed to the fact, that they are the result of the observation of more than a thousand cases of hooping-cough, the greater number of which have passed under my notice, at one of our principal and most useful metropolitan institutions: viz., the Hospital for Sick Children, Great Ormond Street.

There are certain important facts in the history of this malady which are well deserving of attention, and should be

* The attendance in the out-patient department of the Hospital for Sick Children varies between 16,000 and 20,000 per annum; giving an average of more than 2600 per annum to each of the medical officers. Nine hundred and nine cases of hooping cough are noted in my own case book, between June 1872 and July 1876. From later observations I am inclined to think this does not represent the entire number in the total of rather more than 10,000 cases. So that we may estimate the ratio in which hooping-cough occurs at least at 10 per cent. of the total number of cases brought to the hospital.

taken into account when broad general principles are the objects of inquiry.

Just two centuries ago 18,732 deaths were registered in London, and of this number two only were attributed to hooping-cough. At the present time one death in thirty is registered as due to this disease. We find the old term chin-cough first mentioned in the bills of mortality for 1678, and in 1701 there is the following entry :

Cough	3	}
Chin-cough	...	2		
Hooping-cough	...	1		

total 6, in a mortality in London of 20,471;

which is the first occasion of the introduction of the term hooping-cough into the public register of deaths. It will be seen from the following tables how this mortality has increased till it has reached its present average ; how that average varies within certain limits, and to what extent the character of the contagion is strongly marked by the fact that nearly all the deaths it causes occur before the age of five years, and nearly half of these before the age of twelve months.

Year.	Chin-cough.	Hooping-cough.	Total Mortality in London.
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1702	...	3	...	1	...	19,481
1703	...	0	...	5	...	20,720
1704	...	1	...	0	...	22,684
1705	...	5	...	0	...	22,097
1706	...	2	...	2	...	19,847
1707	...	2	...	3	...	21,600
1708	...	3	...	3	...	21,291
1709	...	1	...	1	...	21,800
1710	...	0	...	5	...	24,620
1720	...	10	...	33	...	25,454

Cough, Chin-cough, Hooping-cough.

1730	152	26,761
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Cough and Hooping-cough.

1731	33	25,262
1740	280	30,811
1757	239	21,813
1758	84	17,576

Hooping-cough.

1840	...	...	582	...	...	25,206
1841	...	...	1217	...	...	24,197
1842	...	...	839	...	...	23,699
1843	...	...	980	...	...	24,947
1844	...	...	639	...	...	24,878
1845	...	...	879	...	...	23,392
1846	...	...	966	...	...	23,306
Average of 15 years		857	...	...	24,883	
Or	...	...	1	...	...	29

Mortality in London from Hooping-cough.

1860	...	2023	1865	...	2921	1870	...	1935
1861	...	3497	1866	...	2933	1871	...	3249
1862	...	2150	1867	...	2251	1873	...	2689
1863	...	2229	1868	...	2369	1874	...	1861
1864	...	2386	1869	...	3755	1875	...	3232

During this year 1876.

January, February, and March 1229.

Total Mortality in England.

1866	...	...	15,764	...	...	500,689
1870	...	...	11,900	...	...	515,329
1872	...	...	13,006	...	...	492,265

Table of Mortality under One Year and Five Years, with Sex.

MALES.				FEMALES.			
Total.	Under 1 year.	Under 5 years.	Total.	Under 1 year.	Under 5 years.	Total.	
1868 {	England	4091	1832	3495	5132	2064	4927 {
	London.	1061	411	1024	1277	446	1229 {
1869 {	England	4878	2155	4722	6088	2404	5854 {
	London.	1708	654	1652	2061	719	1989 {
1870 {	England	5482	2521	5322	6419	2679	6180 {
	London.	929	372	910	1027	369	994 {
1871 {	England	4546	2029	4403	5814	2279	5584 {
	London.	1045	397	1014	1246	415	1185 {

Comparative Table for England, 1870.

Small-pox.	Measles.	Scarlatina.	Diphtheria.	Hooping-cough.
2620	7543	32,343	2699	11,901
			Typhus.	Typhoid.
			3297	8731

II.—PREVALENCE OF HOOPING-COUGH.

THE conditions which exert an influence on most contagious maladies are less well-defined in the case of hooping-cough, than in any other disease we are acquainted with. It seems to prevail in all countries, whether densely or little populated. In the central part of Africa it was met with by Livingstone not unfrequently, and in all parts of Europe and America is familiarly known. Like many other maladies of similar nature, it appears to prevail at certain periods of the year, particularly during the late winter and early spring months, and the late autumnal season. This prevalence is not so decided as is generally supposed, on account of the symptoms assuming a different form in the warm season of the year, as compared with those which occur when the temperature of the atmosphere is diminished, and the respiratory organs are chiefly affected.

With regard to the early age at which so many are attacked by it, some such law as the following may be deduced from an analysis of the bills of mortality, and is confirmed by general observation.

If sixty-four children be taken under five years of age, it is probable that

32 will be attacked before the age of 12 months.

32 + 16 (48) „ „ 2 years.

 + 8 (56) „ „ 3 years.

 + 4 (60) „ „ 4 years.

 + 2 (62) „ „ 5 years.

III.—OCCURRENCE OF A SECOND ATTACK.

THE occurrence of a second attack is decidedly rare. It is generally, if not always, to be traced in the most distinct manner to direct exposure to an atmosphere strongly infected with

the contagious principle. For example, the eldest child in a family is liable to a second attack, when several of the younger children are affected simultaneously, the eldest child having suffered in infancy. And thus the most frequent instances of adults being twice affected are mothers of families, who are exposed to infection while nursing their children through the various stages of the malady ; and this is more frequently the case when there is an infant at the breast which is suffering. During the period from June 1875 to July 1876, in a total of 303 cases, there were five instances of a second attack in children. They were the eldest in families where all the younger children had been infected ; and though the eldest had suffered once before, yet from association with the younger ones, and from exposure to a thoroughly infected atmosphere, a second infection was produced. In two instances of a second attack in the mother, the child was under a year, and was at the breast.

IV.—SYMPTOMS.

By the use of the term hooping-cough, which keeps constantly before the mind a peculiar, and certainly when present, a diagnostic symptom of the disease, we are led to overlook the numerous cases in which the whoop is absent, and there is no respiratory disturbance beyond a cough of ordinary catarrhal character.

Close observation of the number of instances in which the whoop occurs, as compared with that in which it is absent, leads me to estimate the ratio at about one to two : in other words, in a family of *three* children simultaneously affected, only *one* will suffer distinctly from cough accompanied by a whoop. We can understand the reason why the whoop seldom occurs in children under the age of twelve months, when we consider how imperfectly the vocal organs are developed previous to that age, and the great prevalence of hooping cough during the first year of life lends independent support to the probability that the ratio above stated is correct.

This disease resembles others of contagious character, in requiring a period of incubation previous to the development of the symptoms by which it is specially distinguished. From ten to fifteen days is the usual interval which occurs between exposure to infection and the earliest diagnostic symptoms, as determined from several cases of children who were brought to the hospital for some other malady; generally three weeks or a month will elapse before the attention of the mother will be so far directed to the peculiar distress produced by the malady, as to lead her to regard it with more concern than the cause for which she brought the child, in the first instance, for examination and treatment.

The first of the early symptoms are unusual restlessness and febrile disturbance, particularly during the night, with such increased temperature (101° — 103°), as occasionally to lead to the suspicion of pneumonia. It frequently happens that this condition is referred to dentition, particularly if there is any cerebral excitement. The digestive organs are next affected, and loss of appetite, with more or less urgent thirst follow soon and coexist with the febrile symptoms.

In young children in particular, the disease assumes at this period a distinctly spasmodic character, and the attacks of vomiting are violent, sudden, and often accompanied by peculiarly noisy retching. The diarrhoea is also spasmodic, and is attended by, or rather appears to be directly produced by impulsive intestinal contractions, of similar origin to the spasmodic cough.

The organs of respiration are generally the last to suffer, and the acute febrile disturbance somewhat abates before the cough assumes well marked periodic and special features. The influence of temperature in determining the course taken in the later stages of the disease explains the apparent epidemic occurrence of hooping-cough. In cold weather the natural tendency to catarrhal affection of the bronchial tubes is apparently the reason why, in the winter months, the effects of the contagion are exhibited most distinctly by pulmonary disturbance; while in the warmer season of the year it is the most frequent cause of the diarrhoea of infants.

The probability that the various symptoms which have been enumerated are to be referred to a specific cause is admitted by numerous authorities, among others by the late Sir Henry Holland. In his *Medical Notes and Reflections*, p. 89, 1839, he advances the following opinions :

"But the connection of symptoms between hooping-cough and the infantile fever goes beyond this, and points at some common or similar cause, modified in its effects by acting on different temperaments or parts of texture. The hooping-cough rarely prevails as an epidemic, without being conjoined with great frequency of those bowel disorders among children, attended with remittent fever, to which in their more marked form, this name of infantile fever has been applied. And if objection be made that the one disorder is infectious, the other not, it may reasonably be asked whether the latter assumption is certain ; whether the occasional infection in this fever is not proved as clearly as in erysipelas or dysentery ? and whether the mode of proof is not the same as for hooping-cough itself ?"

V.—TREATMENT.

AFTER making fair trial of the various specific remedies which have been recommended for hooping-cough, it appears to me certain that better results are obtained from the inhalation of carbolic acid vapour than from any other plan of treatment. The effect which is produced by the inhalation of the vapour obtained in the manufacture of coal gas has been recognised for many years, and is put to practical use, especially on the Continent, where it is the custom to send children suffering from the disease to the nearest gas works. It is quite reasonable to raise the question whether some of the very various products of the distillation of coal or wood may not be more potent than carbolic acid in their effects on hooping cough ; but further experiments are required to decide their relative merits.

Those cases in which the inhalation of carbolic acid vapour

has been actively employed, have usually terminated by a rather sudden cessation of the spasmodic disturbance of the respiratory organs, succeeded by an attack of diarrhoea lasting three or four days, and subsiding without medicinal treatment. In the majority of cases, however, there has been simply a daily decrease in the violence of the cough, and a disappearance of the symptoms within a period varying from a fortnight to three weeks. It is important in making fair trial of this remedy, to provide against the injurious effects which result from the inhalation of a too concentrated vapour of the acid, so that it is necessary to allow a child to remain several hours daily in a dilute atmosphere, rather than to administer strong inhalations for short periods of time.

The facilities afforded in public institutions of carrying out the treatment in a satisfactory manner are so great, that it becomes a question deserving of attention whether experiments on a large scale ought not to be made by the proper sanitary authorities, particularly for the sake of the poorer classes of society, who are unable to spare a separate room for the special purpose described.

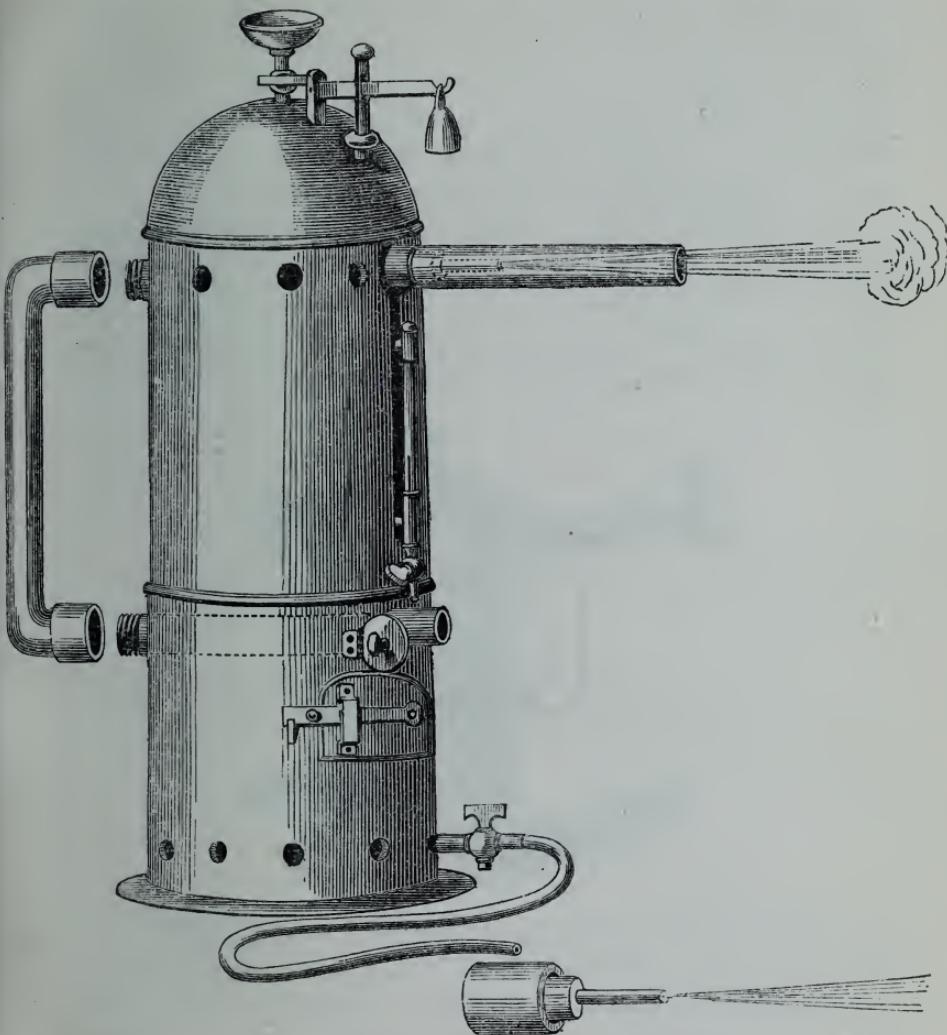
The best method of obtaining the vapour of carbolic acid so combined with atmospheric air as to be inhaled without injury, is to produce a jet of steam from a boiler containing a mixture of carbolic acid in water in the proportion of 1 to 40.

In order that the vapour may be thoroughly diffused through the atmosphere of a room, I have used a machine constructed for the special purpose, which the accompanying illustration exhibits in such a manner, as to make it intelligible how the thorough combination of the atmosphere with the carbolic acid is obtained.

The capacity of the boiler is about a gallon and a half, and the heating arrangement is a simple circular gas burner. The boiler should be filled with a solution of carbolic acid of 1 in 40, and the stream of vapour be allowed to continue without interruption during day and night, which requires that the boiler should be refilled once in the twenty hours.

The well-known good effects of the inhalation of warm vapour, induced me to provide for this in addition, by an arrangement

which raises the temperature of the air passing through the



draft-tubes, as shown in the diagram, so that the air of a room may be warmed as well as carbolised.

Up to the present time, it has not been possible to open the special ward in the hospital in Ormond Street for the treatment of cases of hooping cough, so that during the past winter I have only been able to expose the children who were suffering to the effect of the treatment during the period of an hour at a time, and this only once or twice a week. But even

under this limited use, there was undoubtedly an amelioration of the severe spasmodic cough. It has been chiefly, however, from those cases which have been superintended by myself or other practitioners in private practice, that such satisfactory results have been obtained as to justify the conclusion that the inhalation of carbolic acid vapour has a most distinct effect upon hooping-cough, when it is properly administered.

The time will probably come when it will be possible to send children suffering from hooping-cough to rooms for the purpose. As a substitute for this, Mr. Harper, of Red Lion Street, Clerkenwell, has constructed a small and simple machine on the same principle as that described in the larger



one, which supplies a stream of carbolised vapour sufficient for the use of one person, and has been found of great service by many who have employed it. With very young children, the vapour may be allowed to pass within a covered cradle, and thus, during sleep, may be inhaled for several hours.

